which , in turn, can be used to determine the initial diffusible hydrogen concentration in a weld sample.

Please amend the paragraph beginning on line 25 and ending on line 4 of page 15 of the Specification as follows:

Significantly, the predictable, linear response of the sensing layer 28 and reflector layer 30 enables the sensor assembly 20 to be calibrated for determining the diffusible hydrogen in a weld sample and, further, for determining the initial diffusible hydrogen concentration in the weld sample, i.e., in the weld material. In this regard, the inventors performed a series of experiments that correlate the slope of a sensor response curve to the initial diffusible hydrogen concentration in a weld sample, such as weld bead 16. The steady state portion of a sensor response curve was assumed to be proportional to the flux, e.g., diffusivity rate, of hydrogen from the weld sample, which in turn is proportional to the initial concentration of hydrogen in the weld sample. Slopes of curves generated with the sensor assembly 20 using welded samples were found to correlate closely with quantitative results for initial diffusible hydrogen concentrations in duplicate welded samples that were analyzed using a standard method, i.e., AWS A4.3-93, for measuring diffusible hydrogen concentrations. The slopes of the generated curves from the sensor assembly 20 also closely correlated with curves developed from a theoretical diffusion equation, based on a form of the error function equation.

Please amend the paragraph beginning on line 5 and ending on line 18 of page 15 of the Specification as follows:

More specifically and with reference to Figure 4, solutions for the theoretical diffusion equation were generated for different initial diffusible hydrogen concentrations as a function of time with the results being adjusted for the average amount of weld metal per sample and multiplied by the ratio of surface area sampled, i.e., sample area 17, to total area of the welded object. The slopes of theoretical curves resulting from the equation solutions were calculated in 2 hour time intervals in units of μliter/minute based on weld samples from gas metal arc welding of HSLA 100 steel.

Using the sensor assembly 20, response curves were then developed for a number of weld samples, the slopes of the response curves were determined, and the slopes were converted to units of μliter/minute, as described above. ~~This calibration data was then~~